NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

RESTORATION AND MANAGEMENT OF DECLINING HABITATS
(acre)
Code 643

DEFINITION

Restoring and conserving rare or declining native vegetative communities and associated wildlife species.

PURPOSES

- Restore land or aquatic habitats degraded by human activity.
- Provide habitat for rare and declining wildlife species by restoring and conserving native plant communities.
- Increase native plant community diversity.
- Management of unique or declining native habitats.

NOTE: NRCS uses the term "wildlife" to include all animals, terrestrial and aquatic.

CONDITIONS WHERE PRACTICE APPLIES

On any landscape which once supported or currently supports the habitat to be restored or managed.

Declining habitats identified herein (Figure #1) are those referenced for Minnesota as critically endangered, endangered or threatened ecosystems. These declining habitats and the locations where they can be restored are:

Tallgrass Prairie -In the tallgrass prairie region of the state.

Oak Savanna – On areas that once supported savannas. Savannas typically occurred on prairie and transition soils.

Red Pine and White Pine Forests – On areas that once supported native stands of Red and White pine.

Aspen Parkland – In the aspen parkland region of the state.

Wetlands of all types – Statewide.

CRITERIA

General Criteria Applicable to All Purposes

- Methods used will be designed to protect the soil resource from erosion.
- Vegetative manipulations to restore plant and/or animal diversity can be accomplished by prescribed burning or mechanical, biological or chemical methods, or a combination of the four.
- Management measures must be provided to control invasive species and noxious weeds in order to comply with state noxious weed laws.
- To benefit insect food sources for grassland nesting birds, spraying or other control of noxious weeds will be done on a "spot treatment" basis to protect forbs and legumes that benefit native pollinators and other wildlife.
- Management practices and activities are generally not to disturb cover during the primary nesting period of May 1 – July 30.
- Management and maintenance activities will generally be restricted to August 1 - September 30 and prior to the primary nesting season. Exceptions could be granted when necessary to maintain the health of a plant community.

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- Mowing may be needed during the establishment period to control weeds.
- Rotate periodic planned management or other treatments throughout the restored or managed area.
- Where feasible, prescribed burning will be utilized instead of mowing. Refer to practice standard Prescribed Burning (338).
- Native species seeded or planted will be adapted to the soil-site conditions.
- Seeding and planting rates will be adequate to accomplish the planned purpose.
- Only high quality and ecologically adapted native plant materials will be used.
- Planting dates, and care in handling and planting of the plant material will ensure that the established vegetation will have an acceptable rate of survival.
- Site preparation shall be sufficient for establishment and growth of selected species.
- Timing and use of equipment will be appropriate for the site and soil conditions.

Criteria for Enhancement of Existing Degraded Habitats

For sites that are not currently cultivated and still exhibit remnant characteristics of the pre-settlement habitat type, it is often best to attempt restoration and enhancement through management techniques such as prescribed burning, brush and weed control, and interplanting with desired species. Refer to the maintenance recommendations section of each habitat type.

Criteria for Tallgrass Prairie Restoration

1. Native prairie plant communities will be established utilizing seed harvested from existing Minnesota native prairies, or utilizing seed mixes comprised of Minnesota ecotype grasses, legumes and forbs, developed to reflect "native prairie" communities as determined suitable for specific site conditions.

2. All seed must be tested for purity and germination.

3. Seed mixes will consist of at least 15 native species. The mixture will be comprised of a minimum 5 grasses, and a minimum 5 forbs. At least one forb shall be a legume.

4. No more than 20% of the grass component will be comprised of cool season species based on seeds per square foot.

5. The mixture will result in a minimum 20 PLS seeds per square foot total.

6. Minimum seeding rates:
   - Native harvest mixtures meeting the minimum requirements above will be considered adequate.
   - Constructed mixtures may be developed using Table #2. Minimum grass seeding rate will be 8.0 PLS lb/ac. Minimum forb seeding rate will be 8.0 PLS oz/ac.

7. Species shall be selected from the following sources:
   - Native prairie harvested seed. Native harvest seed origin shall be within a 200-mile radius of the restoration site.
   - Yellow tag “source identified” plant materials from the nearest available source to the project is preferred. However, Minnesota adapted cultivars obtained through commercial seed vendors are acceptable. The use of cultivars should be avoided adjacent to existing native prairie or other sensitive areas. Refer to Table #1 for a listing of allowable native cultivars and ecotypes.

Table 1: Recommended Native Cultivars and Ecotypes for Prairie Restoration.

Warm Season Species	Variety	Geographic Zone (see standard 327)
Switchgrass	Forestburg Sunburst Dacotah	A,B,C,D A,B,C,D B,C,D,E
Indiangrass	Tomahawk	Statewide
Sideoats Grama	Pierre Butte Killdeer	A,B,C,D A,B,C C,D,E
Blue Grama	Bad River	Statewide
Little Bluestem	Bad Lands Itasca	Statewide
Prairie Cordgrass	Red River	Statewide
Big Bluestem	Sunnyview Bonilla Bison	A,B,C,D A,B,C,D B,C,D,E
Cool Season Species	**Variety**	**Geographic Location**
Slender Wheatgrass	Revenue Adanac	Statewide
Western Wheatgrass	Rodan	Statewide
Canada Wildrye	Mandan	Statewide
Green Needlegrass	Lodorm	Statewide

8. Companion crops can be used to reduce the amount of erosion on critical sites by including Canada Wildrye and/or Sideoats Grama in the mixtures at rates specified in Table 2.

9. Temporary cover crops shall be spring seeded small grains, sudangrass, or millet. Seeding rates are as follows:

SPECIES	RATE	DATE
Oats	2.5 bu/ac	4/1 – 6/1
Barley	1.5 bu/ac	4/1 – 6/1
Sudangrass/Millet	12.0 bu/ac	5/15 – 6/10
Annual Ryegrass	8.0 bu/ac	8/1 – 9/1

10. Seeding Dates:
Seeding will favor warm season grasses over forbs, unless forbs have already been stratified. It is important to mow for weed control during the first summer, especially on silt loam or heavier soils.

- Spring seeding dates shall be May 15 - June 30 statewide.
- Fall Dormant Seeding - offers an excellent opportunity to establish a diverse stand. Fall seeding tends to favor forbs and there is less competition with other planting activities. Dormant seeding shall be completed after November 1 to insure seed will not germinate.

11. Seedbed Preparation and Seeding:
Prepare a firm seedbed for all planting methods.

Conventional Tillage - Prepare a fine firm seedbed to a minimum of 3 inches. The seedbed should contain enough fine soil particles for uniform shallow coverage of the seed as well as contact with moisture and nutrients. If possible, use specialized native grass drills with depth bands designed to handle a wide variety of seed. For conventional drills, as a minimum cultipack before seeding. Cultipack after seeding if possible.

Do not use heavy drills on conventionally prepared seedbeds as heavy drills tend to sink in the soil and depth control is difficult.

Plant seed between one-quarter and one-half inch deep. Some seed may be seen on the surface of the ground after seeding. Tillage should only be used on flatter slopes or in conjunction with erosion control measures.

No-Till - No-till drilling reduces the exposure of the newly seeded site to erosion. A no-till drill must be used to seed these sites. A drill should be selected that can handle a wide variety of seed (fluffy, smooth, large, and small) and low seeding rates. Plant seed to a depth of one-quarter to one-half inch deep.

Use of a herbicide is essential in order to kill existing vegetation. Land that has been in grass for many years usually has a thick residue layer on the soil surface. To allow for the best no-till seedbed, this residue must be removed.

Three options are (1) grazing, (2) mowing with residue removed, and (3) prescribed burn. In the fall a burndown herbicide can be applied to prepare for a spring no-till seeding. An additional spring herbicide application may be required, depending on plant growth.

Broadcast - Prepare a fine firm seedbed to a minimum of 3 inches. Use a roller, cultipacker or similar implement prior to seeding. The seedbed should contain enough fine soil particles for uniform shallow coverage of the seed as well as contact with moisture and nutrients. Broadcast seed at a rate of 1.5 times the normal seeding rate and roll or cultipack again after seeding. Do not harrow in the seed.

12. Weed Control:
During the establishment year, mow weeds after they have reached a 12" height. Mow 2 – 3 times, generally on 30 day intervals from the date of seeding. Mow to a 6-8" height. Use a rotary mower or remove the clippings so as not to smother the seedlings. This will slow the weeds but won't harm the prairie plants.

The second year, evaluate the stand to determine if weed control is necessary. If it is, spot mow the planting at a height of six inches. If there is enough material for a prescribed burn, this may be an effective method to control weeds.

13. Maintenance:
Prairie communities are best managed by the use of prescribed grazing or prescribed fire. Other management techniques include mowing/haying and prescribed grazing. Periodic management will normally be required to maintain stand vigor and persistence of desired plant species.

Fall burns and early spring burns tend to favor forbs. Late spring burns provide maximum stimulus to warm season plants and work well to control cool season grasses. Burn when cool season grasses are growing and warm season plants are just beginning to grow.

Woody vegetation control becomes critical in maintaining areas in prairie. Undesirable woody vegetation may be controlled by early spring or fall burning, or cutting/girdling with spot chemical treatment to remove the plant or prevent sprouting.

14. Chemicals used in performing this practice must be Federally, State, and locally registered and must be applied in accordance with label directions.

Criteria for Oak Savanna Restoration
Prior to European settlement, oak savanna was common in a long narrow diagonal zone northwest to southeast across Minnesota. This community is characterized by widely spaced, open grown trees/shrubs and greater than 30% prairie grassland understory. The canopy cover is broken to scattered and ranges from 10% to as high as 70%.

Apply this practice to lands suited to the appropriate planned oak savanna community restoration (Mesic or Dry) as identified in figure 1.

1. Restoration Design:
   - 50%-75% of the site shall be established to native prairie according to the practice specifications for "Tallgrass Prairie Restoration". 25%-50% of the site shall be established to native oak trees and native shrubs.
   - Planting stock for oak savanna establishment shall consist of Minnesota ecotype species: Bur Oak (*Quercus macrocarpa*), White Oak *(Quercus alba*), Black Oak *(Quercus velutina*), Swamp White Oak *(Quercus bicolor*) or Northern Pin Oak *(Quercus ellipsoidalis*) adapted to the site conditions and savanna type planned.
   - Select native shrubs adapted to the site conditions. Refer to practice standard Upland Wildlife Habitat Management (645). Predominant savanna shrub species include: Plum (*Prunus spp*), Dogwood (*Cornus spp*), Rose (*Rosa spp*) and American Hazel (*Corylus americana*).

- Minnesota ecotype seedlings developed to reflect native communities and obtained through commercial vendors and determined suitable for specific site conditions may also be used.

2. Planting Rate:
   - Trees and shrubs will be planted at a rate of 100-125 trees/shrubs per acre. On wetter sites, up to 250 trees/shrubs per acre may be planted if recommended by the MDNR Forester.
   - Woody plantings shall consist of 80%-100% oaks with the balance comprising native shrubs.

3. Planting:
   - For restorations less than 10.0 acres in size, the tree/shrub planting shall be in the form of clumps, not plantations, and shall be planted at a rate of 25 trees/shrubs per clump. Distribute the clumps throughout the project area.
   - For restorations greater than 10.0 acres in size, the tree/shrub planting shall be in the form of blocks. Each block will not exceed 5.0 acres, and will be distributed throughout the project area. Shrubs as applicable, shall be randomly intermixed with the oaks.

4. Site Preparation and weed control:
Refer to practice standard Windbreak (380).

5. Planting Dates:
Planting will be done in the spring, prior to June 1.

6. Maintenance:
Oak savannas are plant communities that developed and are maintained by fire. General guidance for management of the understory component is as follows:
- To produce barrens understory structure of grasses without brush, utilize late spring and summer burns. Frequent "low intensity" burning techniques are necessary such as the "backfire" method on a 1-3 year interval.
- To produce scrub barrens with a sparse brush and grass understory, high intensity fires at intervals of 5 years or greater are necessary.

Avoid burning the savanna portion that contains trees and shrubs until they reach a size resistant to fire, usually a minimum of 5 years following establishment.

Criteria for Red and White Pine Restoration
Apply this practice to sites where the soils and climate are suitable for growing red pine *(Pinus resinosa*) and white pine *(Pinus strobus)*. Sites will be located within the historic range as identified in figure 1.

1. Restoration Design:
   - Each planting site shall contain a mixture of primary and secondary species as follows:
     - Primary Species: both red pine and white pine.
     - Secondary Species: three native hardwood tree species and one native shrub species suited to the ecoregion and site conditions.

     Note: where desired, an understory native conifer may be substituted for one of the hardwood species.
   - Where practical, the planting patterns should be altered to reflect the random nature of a natural forest stand. Rows of single species should be avoided.
   - Planting stock shall consist of Minnesota ecotype red pine and white pine, from known and documented seed sources.
   - Planting stock for native hardwood trees and shrubs will be adapted to the site conditions.

2. Planting Rate:
Plantings should establish 300 to 500 red and white pine per acre, and 100 to 300 hardwood trees and shrubs per acre.

3. Planting Dates:
Planting of all bare root stock will be done in the spring, as soon as site conditions allow, but prior to June 1.

Planting of container stock may occur after June 1, provided soil moisture conditions are adequate.

4. Site Preparation and Maintenance:
Refer to practice standard Tree Planting (612).

Criteria for Aspen Parkland Restoration
The tallgrass aspen parkland occupies a broad zone of gradual transition between the prairie, forest and peatlands as identified in figure 1.

Historically, this community was characterized by a dominance of tallgrass and wet prairie, and a sub-dominance of scattered shrub thicket, bur oak and aspen groves. Floodplains were comprised of Elm and Ash.

Apply this practice to sites where the soils and climate are suitable to the appropriate habitat components:

Restoration Design:
Parkland restoration must take into consideration a number of planning issues including; landscape considerations, species selection and composition, and the effects on "at risk species". Therefore, it is recommended that the MN-DNR be involved in the project design and restoration plan.

Prairie Component:
Follow the specifications for "tallgrass prairie" restoration. Additional wet/brush prairie species may include sedges *(Carex spp.)*, willow *(Salix spp.),* bog birch *(Betula glandulifera),* and shrubby cinquefoil *(Potentilla fruticosa).*

Wetland Component:
Wetlands will be restored based on practice standard Wetland Restoration (657).

Woodland Component:
The aspen component will be comprised primarily of trembling aspen *(Populus tremuliodes).* Balsam poplar *(Populus balsamifera)* may be included as a secondary component.

Aspen will be established by one or a combination of the following methods:

- Natural regeneration – due to the suckering characteristic of aspen, sites with minimal disturbance may best be established through discontinuing the disturbance activity and allow passive regeneration.
- Planting – on sites where passive regeneration will not meet restoration objectives planting may be necessary.
    1. Plant materials shall consist of Minnesota ecotype species,
    2. Planting shall be in the form clumps, not plantations.
    3. Trees shall be planted at a rate of 25 trees per clump, with 100-125 trees per acre.

Additional tree and shrub species may include; American hazel *(Corylus americana),* chokecherry *(Prunus virginiana*), plum *(Prunus americana*), serviceberry *(Amelanchier spp.),* and bur oak *(Quercus macrocarpa).*

Site preparation and planting shall follow practice standard Tree Planting (612).

Maintenance:
Management of parkland restorations are best accomplished through the introduction of controlled fire to restore the natural dynamics of the parkland.

For more information on prescribed burning see practice standard Prescribed Burning (338). Additional guidance may be found in the tallgrass prairie and oak savanna sections of this standard.

Criteria for Wetland Restoration
Refer to practice standards Wetland Restoration (657) and Wetland Enhancement (659).

CONSIDERATIONS

Confer with other agencies and organizations to develop guidelines and specifications for conserving declining habitats.

In many cases threatened and endangered species or species of concern will benefit from conservation of declining habitats.

Haying, grazing and tree harvest will be planned and managed as necessary to achieve and maintain the intended purpose of managing wildlife habitat.

All habitat manipulations will be planned and managed according to soil capabilities and recommendations for management will avoid excessive soil loss.

PLANS AND SPECIFICATIONS

Plans and specifications for establishment and maintenance of this practice shall be prepared for each habitat type. Plans and specifications shall be recorded using approved specification sheets, job sheets, and narrative statements in the conservation plan or other acceptable documents.

For wetland restorations, prepare site specific plans and specifications following practice standard Wetland Restoration (657).
For prairie, parkland and oak savanna restoration, site specific plans and specifications shall be developed based on this standard.

For red and white pine restoration, site specific plans and specifications shall be developed based on practice standard Tree Planting (612).

OPERATION AND MAINTENANCE

A restoration project may require many years to achieve the biological diversity that approximates a native habitat. Proper management of the restored area is essential for the restoration to achieve and maintain the full potential of the site for the desired habitat type. As vegetation matures and goes through successional stages, changes in management practices including introduction of new species may be required to maintain and enhance the desired habitat type.

Any use of fertilizers, pesticides and other chemicals shall not compromise the intended purpose of this practice.

Follow-up habitat assessments shall be performed on a regular basis to asses progress of planned activities.

REFERENCES

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Noss, Reed F.; LaRoe III, Edward T.; Scott, Michael J. 1995. "Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degredation". U.S. Department of Interior, National Biological Service, Biological Report 28.

Minnesota Natural Heritage Program. 1993. Minnesota's Native Vegetation: A Key to Natural Communities. Minnesota Department of Natural Resources, St. Paul, MN. 110 pp.

Nuzzo, V. 1986. Extent and status of Midwest oak savanna: pre-settlement and 1985. Natural Areas Journal 6(2):6-36.

Packard, S; Mutel, C.F. (editors). 1997. The Tallgrass Restoration Handbook: For Prairies, Savannas, and Woodlands. Island Press. 463 pp.

United States Department of Agriculture. 1995. Revegetating with native grasses

White, A.S. 1986. Prescribed Burning for Oak Savanna Restoration in Central Minnesota. USDA Forest Service Res. Pap. NC266; North Central Forest Experiment Station, St. Paul, MN. 12 pp.

Table 2: Recommended Seeding Mixtures for Native Prairie Restoration

Seeding rates are listed in pounds pure live seed (PLS) per acre. All seeds shall be tested by a qualified laboratory and labeled for sale in Minnesota as prescribed by the Minnesota Department of Agriculture.

Grasses:

Species	% of Mix	Full Seeding Rate (lb/ac)	Seeds per Square Ft. (1 lb/ac)	pH Minimum	Wet Soils[1]	Drought Tolerance[2]	Flood Tolerance
Big Bluestem	*0-50*	*8.0*	*3.8*	*>5.5*	*Yes*	*Moderate*	*Moderate*
Indiangrass	*0-50*	*8.0*	*4.0*	*>5.5*	*No*	*Moderate*	*Moderate*
Green Needlegrass	*0-10*	*8.0*	*4.0*	*>5.5*	*No*	*Moderate*	*Fair*
Little Bluestem	*0-30*	*8.0*	*6.0*	*>5.5*	*No*	*Good*	*Poor*
Sideoats Grama	*0-30*	*10.0*	*4.4*	*>5.5*	*No*	*Good*	*Poor*
Prairie Sandreed	*0-30*	*5.0*	*6.6*	*>5.5*	*No*	*Excellent*	*Poor*
Canada Wildrye	*0-10*	*12.0*	*2.6*	*>5.5*	*Yes*	*Moderate*	*Moderate*
Slender Wheatgrass	*0-10*	*8.0*	*3.7*	*>5.0*	*Yes*	*Moderate*	*Moderate*
Western Wheatgrass	*0-10*	*10.0*	*2.6*	*>6.5*	*Yes*	*Good*	*Good*
Blue Grama	*0-20*	*2.0*	*17.5*	*>5.5*	*No*	*Excellent*	*Poor*
Switchgrass	*0-5*	*4.0*	*9.0*	*>5.5*	*Yes*	*Poor*	*Good*
Canada Bluejoint	*0-5*	*10.0*	*91.0*	*>5.5*	*Yes*	*Poor*	*Excellent*
Prairie Cordgrass	*0-5*	*8.0*	*3.8*	*>5.5*	*Yes*	*Fair*	*Excellent*

1 Wet soils are those classified as somewhat poorly drained to very poorly drained.
2 Droughty soils are those classified as excessively drained.

EXAMPLE NATIVE GRASS AND FORB MIXTURE

SPECIES	% OF MIXTURE	FULL SEEDING RATE (PLS LB/AC)	TOTAL RATE/ACRE	TOTAL SEEDS/Sq. Ft
Big Bluestem	*.35 x*	*8.0*	*= 2.8 lb*	*10.6*
Indiangrass	*.30 x*	*8.0*	*= 2.4 lb*	*9.6*
Switchgrass	*.05 x*	*4.0*	*= 0.2 lb*	*1.8*
Canada Wildrye	*.10 x*	*12.0*	*= 1.2 lb*	*3.1*
Little Bluestem	*.20 x*	*8.0*	*= 1.6 lb*	*9.6*
			8.2 lb	***34.7***
			PLS OZ/AC	
Maximillian Sunflower			*1.0 oz*	*1.0*
Wild Bergamot			*0.5 oz*	*0.6*
Purple Prairie Clover			*1.0 oz*	*1.0*
Black Eyed Susan			*0.5 oz*	*1.25*
Yellow Coneflower			*1.5 oz*	*0.9*
Tall Blazingstar			*1.0 oz*	*0.3*
Stiff Goldenrod			*1.0 oz*	*1.0*
Yarrow			*0.5 oz*	*0.5*
Smooth Aster			*1.0 oz*	*1.0*
Silky Aster			*1.0 oz*	*0.6*
			9.5 oz	***8.1***

FORBS AND LEGUMES

The following list identifies native forbs and wildflowers beneficial to upland wildlife and native habitat restoration. The list is not inclusive, and identifies those species, which are readily available through private vendor seed supplies.

Species		Value to Wildlife	Seeding Rate PLS Oz/Acre	Seeds Per Square Ft[1]
DRY				
Dotted Blazingstar	*(Liatris punctata)*	*EX*	*1.0*	*0.3*
Silky Aster	*(Aster sericeus)*	*EX*	*1.0*	*0.6*
Purple Coneflower	*(Echinacea angustifolia)*	*EX*	*2.0*	*0.25*
Showy Penstemon	*(Penstemon grandifloris)*	*G*	*1.0*	*0.25*
Bush Clover	*(Lespedeza capitata)*	*G*	*1.0*	*0.25*
DRY to MESIC				
Leadplant	*(Amorpha canescens)*	*EX*	*1.0*	*0.4*
Butterfly Weed	*(Asclepias tuberosa)*	*EX*	*2.0*	*0.2*
Smooth Aster	*(Aster laevis)*	*EX*	*1.0*	*1.0*
Heath Aster	*(Aster ericoides)*	*EX*	*1.0*	*1.0*
Stiff Tickseed	*(Coreopsis palmata)*	*EX*	*1.0*	*0.3*
Showy Goldenrod	*(Solidago speciosa)*	*G*	*1.0*	*1.2*
Rough Blazingstar	*(Liatris aspera)*	*EX*	*1.0*	*0.3*
Compass Plant	*(Silphum laciniatum)*	*G*	*2.0*	*0.1*
Hoary Vervain	*(Verbena stricta)*	*G*	*1.0*	*7.5*
Prairie Smoke	*(Geum triflorum)*	*G*	*1.0*	*1.0*
MESIC to WET				
Rattlesnake Master	*(Eryngium yuccifolium)*	*EX*	*2.0*	*0.4*
Giant Sunflower	*(Helianthus giganteus)*	*EX*	*1.0*	*0.3*
Common Ox-eye	*(Heliopsis helianthoides)*	*EX*	*2.0*	*0.4*
Tall Blazingstar	*(Liatris pycnostachya)*	*EX*	*1.0*	*0.3*
Yellow Coneflower	*(Ratibida pinnata)*	*EX*	*1.5*	*0.9*
Golden Alexanders	*(Zizia aurea)*	*G*	*1.0*	*0.3*
Canada Tick Trefoil	*(Desmodium canadense)*	*G*	*3.0*	*0.3*
Wild Bergamot	*(Monarda fistulosa)*	*EX*	*1.0*	*1.25*
WET				
Swamp Milkweed	*(Asclepias incarnata)*	*EX*	*2.0*	*0.2*
Panicled Aster	*(Aster lanceolatus)*	*EX*	*1.0*	*0.75*
Boneset	*(Eupatorium perfoliatum)*	*EX*	*1.0*	*N/A*
New England Aster	*(Aster novae-angliae)*	*G*	*1.0*	*1.3*
Joe-pye Weed	*(Eupatorium maculatum)*	*G*	*1.0*	*2.0*
Blue Vervain	*(Verbena hastata)*	*G*	*1.0*	*1.0*
DRY to WET				
Yarrow	*(Achillea millefolium)*	*EX*	*0.5*	*0.5*
Maximillian Sunflower	*(Helianthus maximiliani)*	*EX*	*1.0*	*1.0*
Black-eyed Susan	*(Rudbeckia hirta)*	*EX*	*1.0*	*2.5*
Stiff Goldenrod	*(Solidago rigida)*	*EX*	*1.0*	*1.0*
Purple Prairie Clover	*(Dalea purpurea)*	*EX*	*1.0*	*1.0*

1/ Seeds per square foot based on recommended seeding rate

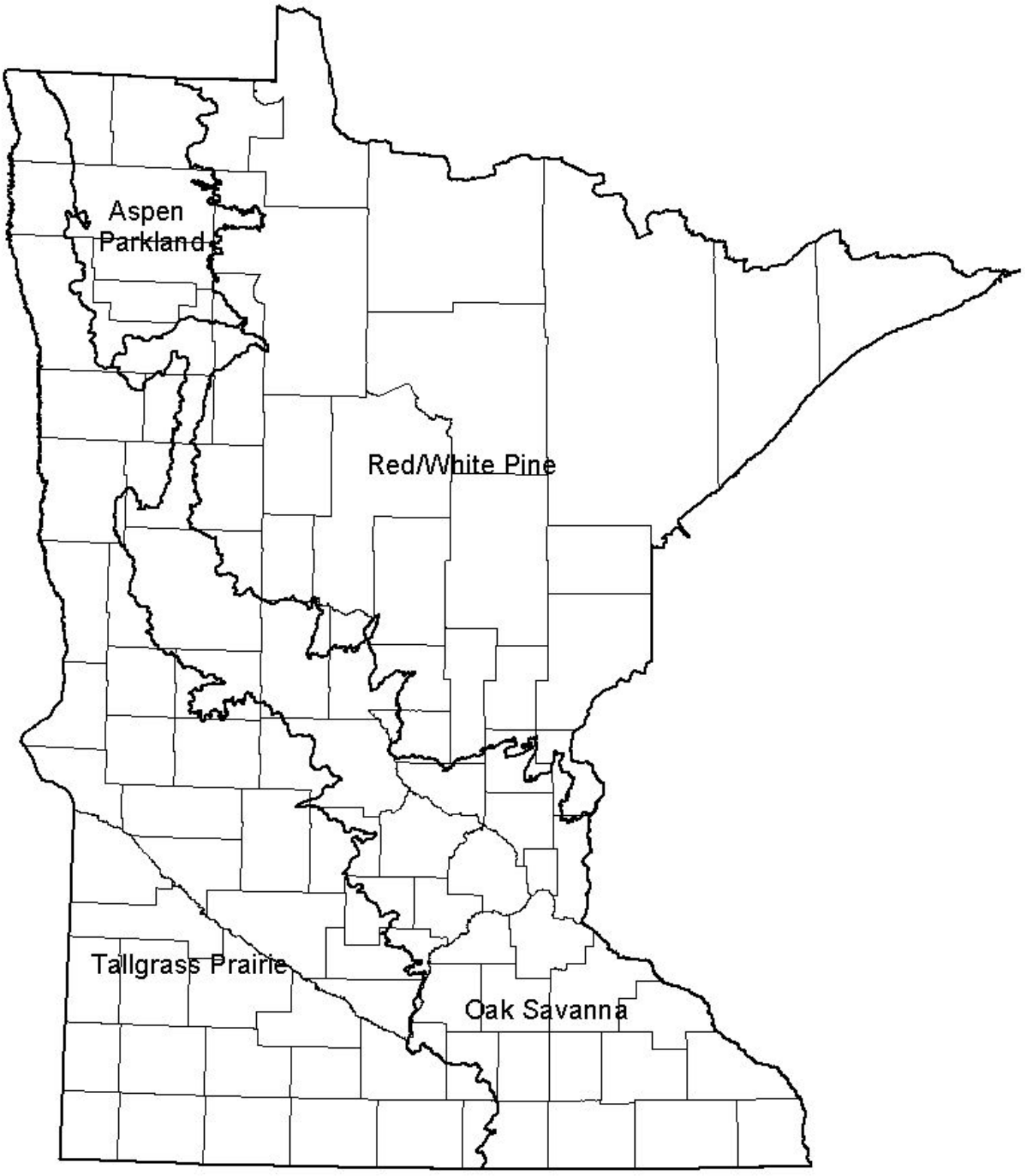

Figure 1: Minnesota's Declining Habitats